



Quality seed production of berseem

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Seed plays an important role in success of any crop and plays a vital role in enhancing and sustaining the food production. Commercial seed production requires healthy, dynamic and genetically pure seed. Good quality seed establishes seed standards of germination, uniformity, genetic purity, free from seed borne pathogens and other prescribed parameters. Superior quality and timely availability of seed is need of the hour. Berseem crop being cross pollinated in nature needs extra care and attention for its seed production. Limited agencies and only small farmers are engaged in seed production of berseem crop. The purpose of seed certification is to maintain and makes seed available to the public, certified, high quality seeds and propagating materials of notified kind and varieties so grown and distributed as to ensure genetic identity and genetic purity. Seed certification is also designed to achieve prescribed standards. Before going in for seed production one should have knowledge about different classes of seed, points to be taken are discussed below:

Depending on the stage of multiplication, seed production is divided into different classes:

– **Nucleus seed:** It is produced by crop breeder, responsible of development of variety. This seed is used for production of breeder seed.

– **Breeder seed:** Breeder seed of berseem is seed or vegetative propagating material directly controlled by the originating or sponsoring-plant breeder of the breeding programme or institution and/or seed whose production is personally supervised by a qualified plant breeder and which provides the source for the initial and recurring increase of Foundation seed. It is genetically so pure as to guarantee. The other quality factors of Breeder seed such as physical purity, inert matter, germination etc. are indicated on the label on actual basis. The production of breeder seed is monitored by team of experts, constituted by ICAR. Colour of tag is golden.

– **Foundation seed:** It is progeny of Breeder seed, or be produced from Foundation seed which can be clearly traced to Breeder seed. Thus, Foundation seed can even be produced from Foundation seed. During the production of Foundation seed, the following guidelines are observed:

– **Foundation seed (Stage-I)** produced directly from Breeder seed is designated as Foundation seed stage-I.

– **Foundation seed (Stage-II)** produced from Foundation seed stage-I is designated as Foundation seed stage-II and will not be used for further increase of Foundation seed and shall be used only for production of certified seed class. Minimum Seed Certification Standards are same for both Foundation seed stage-I and II unless otherwise prescribed. Certification tag is of white colour for both Foundation seed stage-I and II and will contain the information as to its stage. Production of Foundation seed stage-II is expressed by Certification Agency that Breeder seed is in short supply of particular crop variety. Production of Foundation seed stage-II may be adopted for berseem being cross pollinated crops gene-pools does not lose their genetic identity and purity.

– **Certified seed:** It is the progeny of Foundation seed and its production is handled as to maintain specific genetic identity and purity according to standards prescribed for the crop being certified. Certification tag for certified seed is of blue colour (shade ISI No. 104 Azure Blue).

– **Truthfully labeled seed:** If the demand for certified seed is much more than actually available, the seed Act has provision for production of truthfully labeled seeds in large quantities. If seed is not certified but are above the minimum limits of germination and purity are truthfully labeled. Colour of tag is opal green.

Berseem, a leguminous fodder crop, is useful for both milch and draught animals. It is grown on land with irrigation facility during *Rabi* season. It also improves soil fertility and add total nitrogen, organic carbon and available phosphorous. It has wider adaptability in adverse soil conditions and is called 'King' of fodder crops. Good growth and fodder yield obtained under long duration of cool temperature.

Exclusive characteristics of varieties :

BL 43 : It is a quick growing, tall variety with more number of tillers and is newly released variety. It supplies superior quality green fodder of 390 quintals per acre till first week of June and gives good seed yield.

BL 42: It is a quick-growing variety which produces more number of tillers per unit area. It is tolerant to stem rot disease and has superior nutritional quality. It supplies green fodder upto first week of June and yields about 440 quintals per acre of green fodder and has high seed yield.

BL 10: It is a longer duration variety and supplies green fodder up to mid June. Its seed is small and moderately tolerant to stem rot disease. Its nutritive value and voluntary intake are high. It yields about 410 quintals per acre green fodder. Its seed crop matures in the last week of June.

BL 1: It is quick growing and produces more tillers. It is a medium duration variety and is capable of supplying green fodder upto last week of May. It yields about 380 quintals of green fodder per acre. The seed crop matures in the first week of June. Its seeds are bright yellow, bold and attractive.

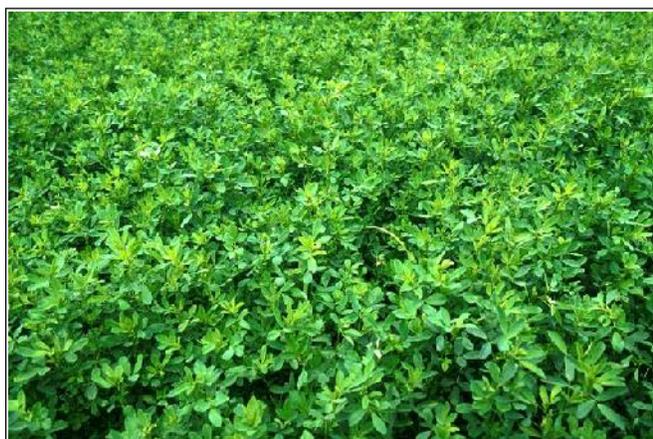


Fig. 1 : Berseem crop in field

Climatic and soil requirements: It needs mild temperature for germination and establishment. Its growth is restricted during intensely cold or frosty weather. It grows well on medium to heavy soils and withstands alkalinity.

Selection of seed plot: Berseem requires land for seed

production to be uniform, fertile, approachable and free from volunteer plants, weed species and other plants. Soil should have good irrigation facility and should be well drained. It is a cross pollinated crop and the pollination takes place by insects. Seed of same crop variety should not be grown on same piece of land on which same crop variety was grown in preceding year unless same variety confirmed seed certification standards.

Selection of variety: Different varieties of berseem are developed and discussed in 'Package of Practices' for Rabi season published by Punjab Agricultural University, Ludhiana. So, farmer should choose variety for seed production according to the requirement.

Source of seed: Seed used for seed production is true to type and genetically pure. It is necessary to purchase seed from reliable source or Government Institutes along with relevant documents.

Sowing: Sowing is done on properly levelled land, free from weeds. A good seedbed prepared with three ploughings, each followed by planking. Early or late sowing results in poor seed production.

Time of sowing: Berseem crop is sown in last week of September to first week of October for fodder and seed production. A successful berseem crop for seed production can also sown in end November or January providing two to three cuttings of green fodder before leaving the crop for seed production.

Seed rate and method of sowing: Eight to ten kg seed, depending upon the viability of seed should be broadcasted in standing water when the weather is calm. In case of windy weather the seed should be broadcasted evenly in dry field followed immediately by raking and irrigation. The seed is required to be free from seeds of chicory (*Kashni*) and other weeds. Seed inoculated with specific Rhizobium culture is used to increase forage yield.

Isolation distance: Maintenance of isolation distance is important for good quality seed production. Isolation is

Table 1 : Varieties recommended for growing in Punjab

Variety	Release	Stem rot resistance	Fodder yield (q/acre)	Duration
BL43	2017	-	390	Quick growing tall variety, provides fodder till first week of June
BL42	2003	Tolerant	440	Quick-growing variety which produces more number of tillers per unit area, provides fodder upto first week of June
BL10	1983	Moderately tolerant	410	It is a longer duration variety and supplies green fodder upto mid June
BL1	1977	-	380	It is a medium duration variety and is capable of supplying green fodder upto last week of May

needed to prevent contamination by cross pollination with different but related variety, to avoid mechanical mixing of seed during harvest. To maintain genetic purity of seed, it is essential to maintain proper and recommended isolation distance from different varieties of same crop in neighborhood (Table 2).

Contaminants	Minimum distance (m)	
	Foundation	Certified
Fields of other varieties	400	100
Fields of the same variety not conforming to varietal purity requirements for certification	400	100

Fertilizer application: Six tonnes of farm yard manure applied alongwith 20 kg phosphorus (125 kg superphosphate) per acre at sowing time. Where farm yard manure has not been added, apply 10 kg nitrogen (22 kg urea) and 30 kg phosphorus (185 kg superphosphate) per acre.

Manganese deficiency: Crop is sprayed twice or thrice with 0.5 per cent manganese sulphate solution (1 kg manganese sulphate in 200 lit of water per acre) at weekly intervals on sunny days. Spray the crop after two weeks of cutting where early symptoms of deficiency appears at cutting stage with the mid-stem leaves of berseem show grey to yellow mottling. Tip and about 1/3rd area from the base remain green. Later this mottling spreads on the entire leaf and colour changes from pinkish to brown which coalesce to form necrotic lesions.

Weed control: Weed like *Itsit* (*Trianthema portulacastrum*) are controlled by delayed sowing to the second week of October, as during this period, the incidence of the weed is drastically reduced due to the fall in temperature or by mixing with raya, a fast growing crop and exerts tremendous smothering effect on this weed. Shaftal, *Kashni* and other weeds are completely removed from the seed crop.

Plant protection: Spray 50 ml of Coragen 18.5 SL (chlorantraniliprole*) or 200 ml of Avaunt 15.8 EC (indoxacarb) or 60 ml Tracer 48 SC (spinosad) per acre sprayed with the help of a manually operated knapsack sprayer using 80-100 lit of water at the initiation of flowers to protect it from gram caterpillar. Black ants and Bihar hairy caterpillar are managed manually or by destroying alternate plants.

Among the diseases, stem rot caused by *Sclerotinia sclerotiorum*, a soil borne disease, attacks the basal portion of the stem and causes it to rot along with white cottony mycelium. Bavistin/Derosal*/Agrozim*/J.K. Stein* (carbendazim) @ 400 g in 200 lit of water per acre sprayed after the first cutting.

Irrigation: The first irrigation is important and should be applied early for a good crop stand. The first irrigation may be given within 3-5 days in light soils and 6-8 days in heavy soils after sowing. After wards it may be applied within 8-10 days during summer and 10-15 days during winter depending upon soil type and weather. Crop is frequently irrigated the during the formation and ripening of the seed.

Flowering and pollination for seed production:

Berseem seed yield mainly depends upon the time of last cut for green fodder and leaving it for seed production. The decision varies with the variety, type of soil and climate. The last cutting should be taken relatively early in low humidity and late in high humidity areas. The optimum time of leaving the crop for seed production is from end March to mid April for BL-43 and by 10th of April variety BL 42 left for seed production. Variety BL-1 left in first fortnight of April and second fortnight of April for BL-10 variety of berseem. It is pollinated by insects attracted to the abundant flowers over extended blooming period. To increase seed set in flowers, pollination by honeybees is necessary.

Variety	Flowering date
BL-43	End of March to mid April
BL 42	10 th of April
BL-10	Second fortnight of April
BL-1	First fortnight of April

To get higher seed yield: Two sprays of 2 per cent potassium nitrate (13:0:45) (2 kg potassium nitrate in 100 litres of water per acre) at weekly interval, starting from flower initiation. Alternatively, give two sprays of Salicylic acid @ 7.5 g in 100 lit of water per acre. Salicylic acid must be dissolved in 225 ml of ethyl alcohol before making the final volume in 100 lit.

Monitoring and inspection: A minimum of two inspections are made from the time of crop approaches flowering until it is ready for harvesting, for genetic purity of seed. First inspection at time of flowering to remove off types based on leaf shape, size and colour. Second inspection after flowering time, nearing to harvest, all

weeds are removed. Field standards of seed production are given in Table 4.

Factor	Maximum permitted*	
	Foundation	Certified
Offtypes	0.20%	1.0%
Objectionable weed plants	None	0.050%

*Maximum permitted at and after flowering.

**Objectionable weed shall be: Chicory (*Kasni*) *Chicorium intybus*

Harvesting: First cutting for fodder is ready in about 50 days after sowing and subsequent cuttings at 40 days during winter and 30 days intervals in spring, thus giving 4-6 cuttings in all. Harvesting of berseem with scythe saves 60 per cent of labour. Seed crop matured in last week May or starting of June. The crop is harvested and threshed by beating with sticks or by trampling with bullocks. Seeds are dried and stored in damp proof stores. The berseem gives an average yield of 2q/acre. Seed

produced is true to type, viable and cheap that helps in obtaining maximum profit from crop and improves economic status of the farmer. Seed produced should follow subsequent seed standards of seed production are given in Table 5.

Table 5 : Seeds produced should follow the standards given below

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	80%	80%

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